V. Appendices

Appendix 00000 - Approved Product List

Schlage Primus Everst, BYU-Idaho copyright only.
Lees Carpets
Mannington Carpets

Appendix 00001 - Sample of Submittal Signature Approval Sheet

Project Name:
Phase Submittal:
Approvals

By _____
Name: David A, Bednar
Title: _President, BYU-Idaho_____
Date: _____

By _____
Name: James R. Smyth_____
Title: _Administrative Vice-President_____
Date: _____

By _____
Name: _____
Title: _Dean of (list appropriate College or Department)
Date: _____

By _____
Name: Charles N. Andersen_____
Title: _Director – Physical Facilities_____
Date: _____

By _____
Name: Rulon R. Nielsen_____
Title: _Manager – Facilities Planning and Construction_
Date: _____

Design professionals

Design professionals' address

Appendix 00002 – Pre-Bid Conference Agenda

Pre-Bid Conference Agenda

Project Name:
Owner: BYU - Idaho
Contractor:
Architect:

1) Introduction of Attendees

2) Parking Arrangements During This Meeting and Construction
3) Designation of Personnel for Project
   a) Owner's Representative:
   b) Special Inspection:
   c) Architect:
4) Contract and Insurance Documents
   a) The Contract will be issued after approval from the Board of Trustees
   b) Insurance documentation is due within 2 days of the contract award.
5) Building Permit
   a) The General Contractor can secure the permit from the City Building Department as a reimbursable.
   b) The Architect responded to all of the review comments from the City Building and Fire Departments.
6) Construction Schedule
   a) Coordination:
7) Project schedule.
   a) Notice to Proceed:
   b) Start Date:
   c) Substantial Completion:
8) Liquidated damages
   a) a) $ per calendar day
9) Subcontractor List
   a) Submit subcontractor list with the bid or within 24 hours of the bid opening.
      i) Copy attached
      ii) Additional Subcontractors:
10) Review Procedures: See also General Conditions
   a) Questions on the plans or substitution requests will be submitted to the architect.
   b) The Owner will not interpret the contract documents.
11) Architect's Field Observations:
   a) Performed from time to time during construction.
      i) Written report goes to the Owner and to the General Contractor.
   b) Owner's Field Observations:
      i) The Owner's Field Observations will be directed through the Architect with a copy to the Contactor.
      ii) The Contractor will receive written direction form the Architect if action is required.
   c) Special Inspections

i) Special inspection will be conducted per appropriate building codes and national standards.
ii) The Special Inspector has the right and responsibility to stop work that is not in compliance with the plans, specifications, codes, national standards, or campus standards.
iii) All necessary corrections will be completed and documented prior to covering the work in question.

d) Closeout Procedures:

12) General Conditions, Section 44 - Project Closeout
i) Contractor shall request a pre-final review of the project when the project is substantially complete.
(1) This will occur after the Contractor has created his own punch list and all noted items have been corrected.
(2) The request for the pre-final shall be in writing and all of the work must be complete at that time.
ii) After the pre-final punch list items are complete, the Contractor notifies the Architect and requests the final walk-through.
iii) After the final walk-through and all items have been judged acceptable, the Contractor may submit the final pay request, O & M Manuals, release of liens, guarantees & warrantees and redlined as-built drawings to the Architect.

b) Payment Procedures:
i) Payment typically 14 days or less after pay request is approved by the Architect. Usually, if a pay request is submitting just prior to a Construction Progress Meting, it can be reviewed and approved at the meeting.
ii) Retainage: 5%
iii) Submit a Construction Schedule and Schedule of values prior to submitting the first pay request.

c) Product substitutions:
i) Specifications, Section 01600-2

d) Submittals:
i) Must have a transmittal letter.
ii) Make certain the submittal is organized and divided into the appropriate number of copies.
iii) Provide 7 copies of each submittal.
iv) Submittals should be numbered by Specification Division and Number. For
v) example: # 15-1 is the first mechanical submittal.

e) Record Documents and subcontractor redlines.
f) Pre-Installation Meetings and Mock-ups

13) Other Items:
a) Construction Parking
b) Toilet Facilities
c) Smoking, language, worker conduct, and radio policies.
d) Permits and Fees
e) Shipments to the campus may be accepted at Stores and Receiving if the project name is on the packages. Stores and Receiving will not deliver any items.
f) Contractor Items
g) Subcontractor items
h) Construction Progress Meeting Schedule

Preconstruction Conference Notes

Project Name:
Owner: BYU - Idaho
Contractor:
Architect:

1) Introduction of Attendees

2) Parking Arrangements During This Meeting and Construction
3) Designation of Personnel for Project
   a) Owner's Representative:
   b) Special Inspection:
   c) Architect:
   d) Jacobson Superintendent:
4) Contract and Insurance Documents
   a) Is the contract signed?
   b) Are copies delivered to appropriate parties?
   c) Is insurance documentation complete?
5) Building Permit
   a) The General Contractor can secure the permit from the City Building Department.
   b) Has the Architect responded to all of the review comments from the City Building and Fire Departments?
6) Construction Schedule
   a) Coordination:
7) The water line project should be finished in the next two weeks.
      i) The electrical extension from the new substation is underway. When will the groundwork be started in the area of the Thomas E. Ricks Building?
   b) Notice to Proceed:
   c) Start Date:
   d) Substantial Completion:
8) Liquidated damages
   a) a) $ per calendar day
9) Subcontractor List
   a) BYU-Idaho and the Architect have reviewed the partial list submitted after, bid opening.
      i) Copy attached
      ii) Additional Subcontractors:
10) Review Procedures: See also General Conditions
   a) Proposal Requests or Requests for Information will be issued by the architect.
   b) The Owner will submit requests through the architect.
   c) The requests will be issued if the design team or Owner wants to investigate the cost and schedule affects of a proposed change
   d) Field Changes: General Conditions, Section 24
11) Architect can issue minor changes in the field that shall be included in the next change order.
      i) Architect shall provide written support for the decision to the Owner.

ii) General Contractor shall provide written response to the Architect and include documentation with the Change Order.

b) Construction Change Directives: See Field Changes.

c) Change Orders: The Change Orders will be reviewed and approved promptly by the Architect and the Owner.

d) Accurate documentation and breakdowns of costs will expedite this process.

e) Requests for Information or Requests for Interpretation:

f) Regardless of the source, these requests will go through the General Contractor and the Architect with a sequential numbering system for tracking. The Owner prefers that the numbers are in the following format: RFI-l

i) ii) The Architect will issue a response within in a day.

ii) The response may include the request for additional time to consider the issue.

iii) The request should include consideration of the schedule.

g) Architect's Supplemental Instructions:

i) These are issued in the design team needs to make a clarification that they feel will not result in additional cost or schedule

ii) The General Contractor and subcontractors have the right to submit legitimate cost proposals in response to the Architect's Supplemental Instructions

12) Contractor Cost Proposal:

13) May be submitted in response to requests or as answers to questions that arise during construction.

i) Cost Proposals must be itemized, detailed and justifiable

14) Architect's Field Observations:

15) Performed from time to time during construction.

i) ii) Written report goes to the Owner and to the General Contractor.

b) Owner's Field Observations:

i) The Owner's Field Observations will be directed through the Architect with a copy to the Contactor.

ii) The Contractor will receive written direction form the Architect if action is required.

c) Closeout Procedures:

16) General Conditions, Section 44 - Project Closeout

i) Contractor shall request a pre-final review of the project when the project is substantially complete.

(1) This will occur after the Contractor has created his own punch list and all noted items have been corrected.

(2) The request for the pre-final shall be in writing and all of the work must be complete at that time.

ii) After the pre-final punch list items are complete, the Contractor notifies the Architect and requests the final walk-through.

iii) After the final walk-through and all items have been judged acceptable, the Contractor may submit the final pay request, O & M Manuals, release of liens, guarantees & warrantees and redlined as-built drawings to the Architect.

b) Payment Procedures:

i) Payment typically 14 days or less after pay request is approved by the Architect.

ii) Usually, if a pay request is submitting just prior to a Construction Progress Meting, it can be reviewed and approved at the meeting.

iii) Retainage: 5%

iv) Submit a Construction Schedule and Schedule of values prior to submitting the first pay request.

c) Product substitutions:
   i) Specifications, Section 01600-2
d) Submittals:
   i) Must have a transmittal letter.
   ii) Make certain the submittal is organized and divided into the appropriate number of copies.
   iii) Provide 7 copies of each submittal.
   iv) Submittals should be numbered by Specification Division and Number. For
   v) example: # 15-1 is the first mechanical submittal.
e) Record Documents and subcontractor redlines.
f) Pre-Installation Meetings and Mock-ups

17) Other Items:
a) Construction Parking
b) Toilet Facilities
c) Smoking, language, worker conduct, and radio policies.
d) Permits and Fees
e) Shipments to the campus may be accepted at Stores and Receiving if the project name is on the packages. Stores and Receiving will not deliver any items.
f) Contractor Items
g) Subcontractor items
h) Construction Progress Meeting Schedule

Appendix 00004 – Product Bid Matrix

DIVISION 14 CONVEYING SYSTEMS

The following information will be included in the Bid Documents of the Specifications.

Bid Breakdown Form, Mechanical

The General Contract bid will be tabulated using the Column "A – Base Bid"

The General Contractor, with the apparent low bid, will provide this form complete, to the Owner, within 24 hours after the bid opening. At that time, the General Contractor's bid must include a items n all columns listed on this form. Prices shall be verified by a copy of the quotation on request.

Vendors not specifically prelisted under alternate columns or "Other" on this form may be submitted as a substitute by the Contractor for consideration by the Owner following procedures noted in the specification. If the column does not have a vendor prelisted and a substitute was pre-approved, the General Contractor may indicate the vendor providing the price in the "Other" column. Items not specifically listed on this form, in the Specification, on the Drawings or as approved in the Addendum to the contract documents, cannot be listed on the Bid Breakdown Form.

The Owner is not obliged to use items in Column "A – Base Bid". The Owner reserves the right to pick and choose from the alternate offerings in any column of the form. The contract shall be adjusted without markup for any price differential between the price listed in Column "A – Base Bid" and that listed in any selected alternative column. The Owner reserves the right to accept or reject any of the Equipment or System items anytime within 90 days after signing the Contract.

Item	Base Bid "A"	"B"	"C"	"D"	"Other"
Section 14240 Hydraulic Elevator	ThyssenKrupp $_____	Otis $_____	Montgomery KONE $_____	U.S. Elevator $_____	$_____

DIVISION 15 MECHANICAL

The following information will be included in the Bid Documents of the Specifications.

Bid Breakdown Form, Mechanical

The General Contract bid will be tabulated using the Column "A – Base Bid"

The General Contractor, with the apparent low bid, will provide this form complete, to the Owner, within 24 hours after the bid opening. At that time, the General Contractor's bid must

include a items n all columns listed on this form. Prices shall be verified by a copy of the quotation on request.

Vendors not specifically prelisted under alternate columns or "Other" on this form may be submitted as a substitute by the Contractor for consideration by the Owner following procedures noted in the specification. If the column does not have a vendor prelisted and a substitute was pre-approved, the General Contractor may indicate the vendor providing the price in the "Other" column. Items not specifically listed on this form, in the Specification, on the Drawings or as approved in the Addendum to the contract documents, cannot be listed on the Bid Breakdown Form.

The Owner is not obliged to use items in Column "A – Base Bid". The Owner reserves the right to pick and choose from the alternate offerings in any column of the form. The contract shall be adjusted without markup for any price differential between the price listed in Column "A – Base Bid" and that listed in any selected alternative column. The Owner reserves the right to accept or reject any of the Equipment or System items anytime within 90 days after signing the Contract.

Item	Base Bid "A"	"B"	"C"	"D"	"Other"
Section 15035 Variable Frequency Drives (VFD)	EMC/Mitsubishi $_____	Safetronics $_____	ABB $_____	Square D $_____	$_____
Section 15200 Seismic Subcontract	Mason $_____	Amber Booth $_____	Kinetics $_____	$_____	$_____
Section 15420 Duplex Sump Pump Package	Hydromatic $_____	Zoeller $_____	$_____	$_____	$_____
Section 15510 Snow Melt	Wirsbo $_____	Heatway $_____	Rehau $_____	$_____	$_____
Section 15520 Humidification Injectors	Dri-Steam $_____	Nortec $_____	Armstrong $_____	$_____	$_____
Section 15310 Non-Electric Steam Driven Pump	PT 300 Armstrong $_____	Spirax Sarco $_____	PPEC $_____		
Section 15540 Pumps	Bell & Gossett $_____	Aurora $_____	Armstrong $_____	Weinman $_____	$_____
Section15540 Condensate Return Unit	Bell & Gossett $_____	Dunham-Bush $_____	Aurura $_____	Weil $_____	$_____
Section 15545					

Glycol Makeup Unit	Power Engineering $_____	Aurora $_____	Pacific $_____	Neptune $_____	 $_____
Section 15670 Chillers	Trane $_____	Carrier $_____	York $_____	 $_____	 $_____
Section 15670 Ice Storage Modules	Calmac $_____	Mueller $_____	 $_____	 $_____	 $_____
Section 15730 Heat Exchangers	Bell & Gossett $_____	Repco $_____	Patterson-Kelly $_____	Ace $_____	 $_____
Section 15730 Domestic HW Converter	Bell & Gossett $_____	Repco $_____	Patterson-Kelly $_____	Ace $_____	Aerco $_____
Section 15730 Steam Generator	Bell & Gossett $_____	Repco $_____	Patterson-Kelly $_____	Ace $_____	Aerco $_____
Section 15745 Terminal Heat Transfer Units	Trane $_____	Carrier $_____	Airtherm $_____	Modine $_____	 $_____
Section 15750 Heating and Cooling Coils	Temtrol $_____	Pace $_____	Trane $_____	Aerofin $_____	 $_____
Section 15855 Package Air Handling Units	Temtrol $_____	Pace $_____	New York Blower $_____	Energy Labs $_____	Haakon $_____
Section 15855 Cabinet Exhaust Fan	Temtrol $_____	Pace $_____	New York Blower $_____	Energy Labs $_____	Haakon $_____
Section 15860 Exhaust Fan	Pace $_____	New York Blower $_____	Cook $_____	Barry $_____	 $_____
Section 15870 Propeller Relief Air Fans	Cook $_____	ACME $_____	Pace $_____	Barry $_____	 $_____
Section 15870 Inline Fans	Cook $_____	ACME $_____	Pace $_____	Greenheck $_____	Penn $_____
Section 15895 Exhaust Hood	Gaylord $_____	Sunair $_____	Halton $_____	Greenheck $_____	 $_____
Section 15930					

Air Terminal Units	Titus $_____	Krueger $_____	Tempmaster $_____	$_____	$_____
Section 15960 Control Air Compressor	Quincy $_____	Ingersoll-Rand $_____	$_____	$_____	$_____
Section 15960 Control Air Dryer	Zeks $_____	Ingersoll-Rand $_____	Hankison $_____	$_____	$_____
Section 15955, 15960, 15965, 15970 Temp. Control Systems	Johnson $_____	Yamas/Barber-Colman $_____	$_____	$_____	$_____
Section 15995, 15190, 15195 Test & Balance/I.D./O&M	Barnett, Inc. $_____	R&S $_____	Bob's Test & Balance $_____	Rice & Associates $_____	$_____

Piping

1. Piping shall meet or exceed ASTM _____ and ISO _____ for steam and condensate lines.
2. Piping shall meet or exceed ASTM _____ and ISO _____ for sewer piping.
3. American made pipe is preferred.

DIVISION 16 ELECTRICAL

The following information will be included in the Bid Documents of the Specifications.

Bid Breakdown Form, Electrical

The General Contract bid will be tabulated using the Column "A – Base Bid"

The General Contractor, with the apparent low bid, will provide this form complete, to the Owner, within 24 hours after the bid opening. At that time, the General Contractor's bid must include a items n all columns listed on this form. Prices shall be verified by a copy of the quotation on request.

Vendors not specifically prelisted under alternate columns or "Other" on this form may be submitted as a substitute by the Contractor for consideration by the Owner following procedures noted in the specification. If the column does not have a vendor prelisted and a substitute was pre-approved, the General Contractor may indicate the vendor providing the price in the "Other" column. Items not specifically listed on this form, in the Specification, on the Drawings or as approved in the Addendum to the contract documents, cannot be listed on the Bid Breakdown Form.

The Owner is not obliged to use items in Column "A – Base Bid". The Owner reserves the right to pick and choose from the alternate offerings in any column of the form. The contract shall be adjusted without markup for any price differential between the price listed in Column "A – Base Bid" and that listed in any selected alternative column. The Owner reserves the right to accept or reject any of the Equipment or System items anytime within 90 days after signing the Contract.

Item	Base Bid "A"	"B"	"C"	"D"	"Other
Section 16155 Motor Starters	Square D $_____	$_____	$_____	$_____	$_____
Section 16160 Panelboards	Square D $_____	$_____	$_____	$_____	$_____
Section 16170 Motor and Circuit	Square D $_____	$_____	$_____	$_____	$_____
Section 16175 Switchgear and Switchboards	Square D $_____	$_____	$_____	$_____	$_____
Section 16180 Overcurrent Protective Devices	Square D $_____	$_____	$_____	$_____	$_____
Section 16181 Transformers	Square D $_____	GE $_____	Virginia $_____	Betz $_____	ABB $_____
Section 16183 Motor Control Centers	Square D $_____	$_____	$_____	$_____	$_____
Section 16510 Lighting Fixtures	DMA $_____	Lithonia $_____	Hubble $_____	Columbia $_____	$_____
Section 16600 TVSS - Integrated	Square D $_____	$_____	$_____	$_____	$_____

Section 16721 Fire Alarm and Detection Systems	FCI $_____	EST $_____	$_____	$_____	$_____
Section 17111 Wire Type Cable Tray	Flex Tray $_____	$_____	$_____	$_____	$_____

Appendix 01400 – Quality Assurance Chart

The following schedule identifies the owner's consultants' participation in the observation and testing process.

OITL = Owner's Independent Testing Laboratory

	Tests Specified	Owner's Consultant	Owner's Testing Lab(s) (Testing)	Owner's Testing Lab (Observation)	Owner's Roof Representative	
Section 02200, Earthwork	X	X	X	X		
Section 02240, Soil Grouting	X	X	X	X		
Section 02710, Foundation Drainage	X		X	X		
Section 03200, Concrete Reinforcement	X	X	X			
Section 03300, Cast-In-Place	X	X	X			

	Tests Specified	Owner's Consultant	Owner's Testing Lab(s) (Testing)	Owner's Testing Lab (Observation)	Owner's Roof Representative	
Concrete						
Section 04100, Mortar	X	X	X			
Section 04200, Unit Masonry	X	X	X			
Section 05100, Structural Steel	X		X	X		
Section 05310, Metal Roof Deck	X		X	X		
Section 05320, Metal Floor Deck	X		X	X		
Section 05500, Metal Fabrication	X		X	X		
Section 07120, Membrane Waterproofing		X				
Section 07125, Concrete Deck Waterproofing		X				
Section 07250, Sprayed-On Fireproofing	X		X	X		
Section 07500, Bituminous Roofing Membrane					X	
Section 07530, Single-Ply Membrane Roofing					X	
Section 07600, Roof Related Sheet Metal					X	
Section					X	

	Tests Specified	Owner's Consultant	Owner's Testing Lab(s) (Testing)	Owner's Testing Lab (Observation)	Owner's Roof Representative	
07700, Roof Accessories						
Section 07900, Joint Sealants	X	X				
Section 08210, Aluminum Doors and Frames	X		X			
Section 08520, Fixed Aluminum Windows	X		X			
Section 08950, Aluminum Curtain Wall	X		X			
Section 15990, System Balancing		X				

Appendix 01410 – Required Testing and Inspection Services

Section 02200 – Earthwork

1. Testing and Analysis:
    a. Recommend that owner retain the services of an independent testing laboratory to perform continuous (full-time) on-site geotechnical observation during rough grading, stripping, excavating, filling, and backfilling operations. Do not commence or perform any of this work without the presence of the testing laboratory. Notify the Testing Laboratory 5 working days in advance of rough grading, stripping excavating, filling and backfilling operations. Provide a minimum of 3 working days notice thereafter.
    b. Recommend that owner retain the services of an independent testing laboratory to perform analysis of fill materials and density testing. Testing procedures, frequency, and requirement for fill materials and placements are to be specified in Section 02200 of the construction documents.
    c. Recommend that owner retain their consultant to provide observation on a "spot check" basis.
2. Specify that the owner's geotechnical testing laboratory shall advise the contractor and the design professional of any materials or operations that in their professional opinion will not produce specified results, and shall perform the following operations:
    a. Observe and evaluate soil conditions at bottom of all excavations; determine limits of excavation where applicable. Evaluate excavation depth and width needed and document size of excavation based on contractor's staking. Perform hand auger borings. Classify soil as per ASTM D 2488 and ASTM D2487.
    b. Qualify on-site and borrow soils for suitability to project requirements.
    c. Observe, evaluate and report contractor's operations within context of soil limitations and project requirements.
    d. Choose location and conduct soil density tests on fill and backfill materials.
    e. When applicable, determine quantities of excavation and/or fill for payment.
    f. Evaluate and report if actual soils bearing values meet soil-bearing values on which building design is based.
    g. Document a comparison between the original soil testing report and borings and that found. Also, report the oversize excavation and depth of excavation.
    h. Perform analysis of fill materials. Testing procedures, frequency, and requirement for fill materials and placements are specified in Appendix 01400.

Section 02200 – Earthwork: Minimum Schedule of Tests

Description	Method of Test	Standard (Pass/Fail)	Frequency	Action Required (If Failure)
1. Excavation Observation	Hand auger boring with Soil Classification per ASTM D2487 and D2488	Judgment by Geotechnical Engineer in comparison with subsurface exploration report.	When all structural excavations are completed and prior to fill or concrete placement.	Additional excavation and/or surface compaction.
2. Fill Testing	A. Mechanical Analysis ASTM D422	Results within Specified percentage ranges for different size particles for each fill type.	1 per 1000 tons or 550 cu yds (which ever produces the most tests), or fraction thereof for each soil type	Reject fill type or retest.
	B. Modified Proctor ASTM D1557	Test required in conjunction with density test for determination of compaction levels.	1 per soil type.	N/A.
	C. Density Test ASTM D1556 or D2922	Minimum specified compaction level (as compared to Modified Proctor).	Reject – additional compaction or removal/ replacement required. Then retest	

Section 02200 – Earthwork: Minimum Testing Table—for consideration

Description	Minimum Percentage Modified Proctor	Modified Proctor
Natural sub-grade (cohesiveless soils)	90%	1/500 sq yd and at every column pad and every 50' under wall/strip footings and fraction thereof (both).
General building fill	95%	1/100 sq yd and fraction thereof
Fill under building foundations & oversize	95%	1 per every 50’ under wall/strip footings and fraction thereof and every column pad
Exterior building backfill (non-structural areas)	90%	1/500 sq yd and fraction thereof
Fill under and within 10' of paved and concrete areas (exterior)	95%	1/500 sq yd and fraction thereof
Landscape fill areas (more structural)	90%	1/1000 sq yd and fraction thereof

Section 02500 — Asphalt Paving – Construction Testing

Description	Method of Test	Standard (Pass/Fail)	Frequency	Action Required (If Failure Occurs)
1. Density	ASTM: D979 (cores).	Minimum of 95% of the density of the maximum Marshall density.	One per 500 tons or fraction thereof per course per day, minimum of 3 tests per installation per course.	Remove and replace.
2. Marshall Properties	ASTM D1559	Meet mix design criteria.	Two tests each day of paving.	Adjust plant mixing. Reject if more than 2 consecutive failing tests.
3. Extraction/Gradation	ASTM D2172 ASTM C136 & C117.	Meet asphalt cement content and aggregate gradation criteria as established by mix design.	Two tests each day of paving. Secured with sample for Marshall.	Same as above
4.Thickness (During paving only)	N/A	Use ruler or other device to spot check compacted thickness during paving.	Once per 100 lineal feet of paving.	Adjust paver screen height.
5. Temperature	N/A	Temperature to range at delivery as specified.	Once per 200 sq ft per day.	Adjust temperature at batch plant.

(For projects greater than 1000/sq ft.)

Description	Method of Test	Standard (Pass/Fail)	Frequency	Action Required (If Failure Occurs)
1. Mix Design and Gradation	ASTM D1559 (Marshall Method of Mix Design) ASTM C136 and C117 (Aggregate)	Refer to specification for requirements	One mix design for each type of mix with aggregate gradations. Adjust mix design (aggregate).	Adjust mix design (aggregate).
2. Asphalt Cement	ASTM D5 (Penetration) AASHTO T49.	Review manufacturer's product certification for acceptance. Test if current certification not available.	Review certifications for each shipment	Do not accept asphalt cement.

Section 02710 – Sub-Drain System

Description	Method of Test	Standard (Pass/Fail)	Frequency	Action Required (If Failure Occurs)
1. Cross-Section	N/A	Review that the drain tile cross-section system was installed in accordance with project documents.		Notify design professional and contractor.
2. Elevation	N/A	Verify drain tile elevation.		Notify design professional and contractor.
3. Performance Test	N/A	Test with water flow or check the drain tile lines before backfilling to assure free flow.		Notify design professional and contractor.
3. Aggregate	ASTM As specified.	All aggregate to meet grading requirements.		Change material & retest.

Section 03310 – Concrete Work – Pre-construction

Description	Method of Test	Standard (Pass/Fail)	Frequency	Action Required (If Failure Occurs)
1. Concrete Materials A. Cement	ASTM C150	Review certification to document conformance. Chemical and physical requirements of ASTM C150. Test if current certificate is not available for all requirements.	One sample for each proposed cement type.	Cement not accepted.
B. Aggregate	ASTM C33	Review tests to document conformance to the requirements of ASTM C33. Test if current test is not available for all requirements.	One sample for each proposed aggregate	Aggregate not accepted.
C. Potential Reactivity	ASTM C289	Review tests to verify material is innocuous according to standard outlined in ASTM C289. Test if current test report is not avail.	One sample for each proposed aggregate.	Aggregate not Accepted.
2. Admixtures	ASTM C494 ASTM C260	Review manufacturer's certification to document conformance to ASTM C494. Verify compatibility of admixtures to work together.	Manufacturer's certifications reviewed prior to start of project for each admixture.	Admixture not accepted.
3.Mix Designs A. Proportioning	ACI 201 ACI 211	Prepare a test batch for each design mix provided by the contractor. The project batch plant to batch design mixes. Conduct all tests. One trial batch and testing for each proposed design mix.	One trial batch for each proposed concrete mix.	Re-design mix.

Section 03310 – Concrete Work – Pre-construction (cont'd)

Concrete Description	Description Method of Test	Standard (Pass/Fail)	Frequency	Action Required (If Failure Occurs)
B. Acceptance	ACI 301	Review proposed mix designs to verify design includes the following info: mix number, specified compressive strength (at 28 days), maximum water/cement ratio, mix proportions, size of coarse aggregate, slump (with and without high range water-reducing agent), air content, specified admixtures and 28 day average compressive strength over design.	Every mix design.	Mix design not accepted.
4. Reinforcement, Epoxy Coated Bars, coated tie wire, and chairs	ASTM A775 ASTM A615	Review certifications to document conformance. The tensile strength of the epoxy -coated bar will meet the requirements set forth under ASTM A615. The epoxy coat shall have a film thickness 8 to 12 mils after fully cured. There shall not be more than an average of 2 holidays per linear foot of coated bar. The plant and rebar must comply with ASTM A775 / A775M. Review production plant reports for all the proceeding.	Test for thickness of coating shall be made on a minimum of two bars of each size used. Bend test of coating flexibility for coating shall be con-ducted on at least one bar of each size used. Holiday testing of coating shall be made on at least ½ of the bar-stock (normally at manufacturers plant). One tension test and one bend test (for all black and coated project rebar) shall be made of each size bar.	Bar not accepted.

Concrete Description	Method of Test	Standard (Pass/Fail)	Frequency	Action Required (If Failure Occurs)
5. Reinforcing Bars	ASTM A615	A615 60 ksi yield grade requirements of ASTM A615	One tensile and bend test per bar size and each type to be used in work.	Do not accept lot of bars.
6. Concrete Uniformity	ASTM C94 Annex A-1	Review certification of document conformance. Limits for variation in unit weight, air content, slump, coarse aggregate content, and compressive strength. Test if current certification is not available for all the requirements.	One per plant per 2 years or fraction thereof.	Do not accept source for concrete.

Description	Description	Standard (Pass/Fail)	Frequency	Action Required (If Failure Occurs)
1. Sampling Fresh Concrete				
A. Slump	ASTM C143	All concrete slump not to exceed design slump. Refer to Specifications.	Test at the point of discharge each and every truck. Slump every truck.	Concrete not accepted
B. Air Content	ASTM C173 (Volummetric) or ASTM C231 (Pressure)	Air content must be in range of design mixes. Refer to Specifications.	One test at start of each day's pour and every 50 yd thereafter in conjunction with casting of compressive strength specimens. Air content test every truck with air-entrained concrete.	Concrete not Accepted
C. Concrete Temperature	ACI 306R-88	Refer to the minimum placement temperatures in ACI 306R, table 3,1 Placement temperatures should not be higher than the minimums by 20? F.	Test each truck as concrete arrives when air temperature is 40? F or below and when 80? F and above	Concrete not Accepted
D. Casting of Compressive Strength Specimens	ASTM C31	Specimens cast by a certified ACI Level I technician	One set of four standard cylinders at start of day's pour and every 50 yd thereafter for each type of concrete for laboratory curing.	N/A
E. Unit Weight and Yield	ASTM C138	The concrete mixture shall yield a minimum of 27 cu ft per yd	One test at start of each day's pour for each class of concrete and every 50 yd thereafter.	Adjust mix design for proper yield
F. Compressive Strength Testing	ASTM C39	Must meet or exceed design compressive strength for each particular concrete class.	One set (1-7 day, 2-28 day and one hold)at the frequency of item D above.	Additional testing and/or concrete rejected.
G. Concrete Delivery		Air-entrained concrete must be	Every truck	Concrete not accepted.

Description	Description	Standard (Pass/Fail)	Frequency	Action Required (If Failure Occurs)
		discharged within 60 minutes from time of initial mixing. Non-air entrained concrete must be discharged within 90 minutes.		
2. Batch Plant Inspection	ASTM C94	ACI Level I technician present at batch plant to verify batching tolerance is not exceeded (random basis).	Random basis. Review plant certifications once during construction.	Concrete not accepted.
3. Floor flatness and levelness	ASTM E1155	Refer to project specifications	All interior slabs and critical exterior flat work. Floor levelness does not apply to cambered or inclined surfaces.	Design professional/owner to determine corrections

Section 04100 – Mortar

1. Specify the minimum and maximum compressive strength for each mortar type for the construction field testing.
2. Specify that contractor shall provide the mortar and grout mix designs. The mix designs shall be designed and signed by a professional engineer employed by a qualified independent laboratory; said laboratory to be other than the owner's testing laboratory. The structural engineer shall approve mortar and grout mix designs after consideration of the pre-construction test results.
3. The owner's testing laboratory shall verify mortar and grout proportions during the construction sampling.

Section 04200 – Unit Masonry

1. Brick selection for testing and approval is required early in the design process. The selected brick must pass color selection and prequalification testing prior to bidding. Brick testing (12 weeks per sample) shall start during schematic design and be completed during the design development phase. Refer to Division 4 – Masonry, 04200 and Appendices 01400 and 01410.
2. Specify all pre-construction testing for this section in the construction documents must be completed by the owner's independent testing laboratory for this project, paid for by the owner and approved by the design professional in writing prior to start of masonry site work.
3. Specify that the contractor shall submit certifications (cement and lime) and all other preconstruction test results performed by the owner's independent testing laboratory to the design professional 30 days prior to the scheduled start of masonry work for written approval prior to the start of work.
4. The structural masonry would be observed and tested based on the building codes, structural engineers and owner's requirements and the Quality Control Plan approved by the building officials. Specify the requirements (Quality Control Plan) for observations and testing. The observation agency and the test laboratory are retained by the owner.
5. Recommend that all thru-wall flashings will be observed by the owner's consultant on a "full time" basis.

Section 4 – Brick Masonry – Pre-construction

Description	Method of Test	Standard (Pass/Fail)	Frequency	Action Required (if failure occurs)
1. Physical Test of Units Properties				
A. All requirements of ASTM C216	ASTM C67 Cut Section	Meet all ASTM C216 requirements for Grade SW, Type FBS. Also review cut section for vitrification if question pour structures. Check specification for required brick type.	Review previous Test data from supplier and one set of brick units tested for each brick. Do not accept brick.	Do not accept brick.
B. Freeze/Thaw Tests	ASTM C67 Method	Brick must pass ASTM C67 requirements after 50 cycles of freezing and thawing.	Review previous Test data & perform freeze/thaw testing for each brick type.	Do not accept brick
2. Mortar Mix Design				
A. Gradation and Quality of Sand	ASTM C144	Meet all ASTM C144 requirements	One sample of source material.	Do not accept sand.
B. Mix Design (7 and 28 day compressive strength, water retention, and air content)	ASTM C270 also, additional trail batch at field flow and test for compressive strength using UBC #21-16. Include pigments, if used.	For laboratory flow mortar, comply with all ASTM C270 property requirements for all mortar types. For field flow mortar, refer to specifications and construction testing table for field mortar strength range requirements.	One trail batch with laboratory flow for ASTM C270 tests and one trail batch with field flow for UBC #21-16 tests, for each type of mortar	Adjust mix design.
3. Test of Assemblages		As required by Structural Engineer. The contractor shall mix mortar and cast test prisms in the testing facility where the prisms will be tested.	Five test prisms of 7 bricks each.	Adjust mix design.
A. Tensile Bond Strength	ASTM E518			

Section 4 – Concrete Masonry – Preconstruction

Description	Method of Test	Standard		Frequency Action

		(Pass/Fail)		Required (If Failure Occurs)
1. Physical Test of Units Properties				
A. Meet all requirements of ASTM C90	ASTM C140	Meet requirements for Grade N Type I as set forth in ASTM C90.	Review previous test data from supplier and one set of blocks tested for each structural block type.	Do not accept block.
B. Shrinkage	ASTM C426	Comply with ASTM: C90, Table 1	Run tests if block does not meet moisture content requirement above.	Do not accept block.
2. Mix Designs				
A. Gradation & Quality of Aggregates Mortar	ASTM C144	Meet all requirements of ASTM C144	One sample.	Do not accept sand.
-Grout	ASTM C404	ASTM C404 Meet all requirements of ASTM C404	One test sample of sand and coarse aggregate.	Do not accept Aggregates
Mortar Mix Design (7- and 28-day compressive strength, water retention, and air content)	ASTM C270 also, additional trial batch at field flow and test for compressive strength using UBC #21-16. Include color pigment, if used	For laboratory flow mortar, comply with all ASTM C270 property requirements for all mortar types. For field flow mortar, refer to specification and construction testing table for field mortar strength range requirements. .	One trail batch laboratory flow for ASTM C270 tests and one tra il batch with field flow for UBC #21-16 test. For each type of mortar.	Adjust mix designs

Section 4 – Concrete Masonry – Preconstruction (cont'd)

Description	Method of Test	Standard (Pass/Fail)	Frequency	Action Required (If Failure Occurs)

C. Grout Mix Design	ASTM C476 UBC NO. 21-18	As required by structural engineer to achieve his required f'm.	One test set per type with trial batch and test prisms.	Adjust mix design.
3. Test of Assemblages A. Prism Compressive Strength	ASTM C1314	Based on structural design. The contractor shall mix mortar, grout and cast test prisms in the testing facility where the test prisms will be tested. Provide structural strengths required by structural engineer.	One set of 5 prisms for each type of block and mortar at 28 days. Where corresponding construction is partially grouted, two sets of prisms shall be made – one grouted and the other nongrouted.	Adjust mix design, use different block and/or redesign wall for low load carrying capacity

Construction
Section 4 - Brick Masonry – Construction Testing Table

Description	Method of	Standard	Frequency	Action Required

	Test	(Pass/Fail)		(If Failure Occurs)
1. Physical Test of Units Properties	ASTM C67	All requirements of ASTM C216, Grade SW, Type FBS. Check specification for the required brick type.	One set of 10 bricks for every 100,000 units or fraction thereof.	Increase sampling frequency for rejection. Notify design professional and owner
2. Mortar Compression Tests (Field Mortar)	UBC No. 21-16	Structural to specify compressive strength range required for field testing of each mortar type.	One set of six (6) 2" x 4" cylinders for every 500 sq ft of wall area or floor level, whichever is less, to give the most tests. 3 tested at 7 days and 3 tested at 28 days.	Increase sampling frequency; review data with structural engineer for action required.
3. Mortar Aggregate	ASTM C144, gradation only	Meet gradation requirements of ASTM C144 and evaluate grain size to per-construction test results.	One sample of material per delivery of sand.	Review test results with Design professional if significant difference from perconstruction tests.
4. Cold Weather Practices	Observe methods	Observe methods B.I.A Recommended Practices and Guide for Cold Weather Masonry Construction and specification requirements (whichever provides most stringent protection)	Daily basis	Notify authorities if work is damaged as result of exposure. Contact structural and materials engineer for remedial action.
5. Test of Assemblages A. Bond Strength	ASTM E518	As required by structural engineer.	One set of 5 test prisms of 7 bricks each at time of sample panel construction and during the first week of masonry construction.	Increase sample frequency and review data with structural engineer.

Construction
Section 4 - Brick Masonry – Construction Testing Table

Description	Method of	Standard	Frequency	Action Required

	Test	(Pass/Fail)		(If Failure Occurs)
B. Water Permeance	ASTM E514	Inspect Masonry. If workmanship not acceptable, contractor to build panel at owner's OITL for testing.	Daily Basis.	Accept or reject portions of work as compared to test panel.

Section 4 - Concrete Masonry – Construction Testing Table

Description	Method of Test	Standard (Pass/Fail)	Frequency	Action Required (If Failure Occurs)
1. Mortar Compression Tests (Field Mortar)	UBC NO. 21-16	Structural to specify compressive strength range required for field testing of each mortar type.	One set of six (6) 2"x 4" cylinders for each type of mortar per every 500 sq ft of wall area or floor level, whichever is less, to give the most tests. 3 tested at 7 days and 3 at 28 days.	Increase sampling frequency; review data with structural engineer for action required
2. Grout Compression Tests	ASTM C1019 NCMA – TEK 71 UBC NO. 21-18	As required by structural engineer to achieve required f'm.	One set of 4 prisms every 500 sq ft of wall area or floor level, whichever is less, to give the most tests. One prism tested at 7 days and 3 at 28 days.	Increase sampling frequency; review data with structural engineer for action required
3. Compressive Strength of Prism * (Refer to note below) *Where corresponding construction is partially grouted, two sets of prisms shall be cast and tested – one set grouted and the other not grouted for noted frequency.	ASTM C1314	As required by structural engineer to achieve required f'm.	One set of 4 prisms per every 5000 sq ft of wall area, or floor level, whichever is less, to give the most tests. One prism tested at 7 days and 3 tested at 28 days.	Increase sampling frequency; review data with structural engineer for action required.
4. Cold Weather Practices	Observe methods onsite	IMIAC Recommended Practices and Guide for Cold Weather Masonry Construction and specification	Daily basis	Notify authorities if work is damaged as result of exposure. Contact structural and material engineers for remedial

		requirements (whichever provides the most stringent protection).		action.
5. Physical Test of Units Properties	ASTM C140	Meet requirements of Grade N, Type I as set forth in ASTM C90.	Once during 1st wk of masonry construction and randomly thereafter for each size and type	Check production, increase testing frequency. Notify structural engineer.
6. Mortar and grout mix aggregate gradations.	ASTM C144 ASTM C404	Meet gradation requirements of ASTM C144 or ASTM C404, respectively.	Sampled on site after aggregate is delivered (each delivery immediately).	If significant difference design professional to evaluate and determine action.

Sections 05120, 05310, and 05500 - Structural Steel, Steel Decking, and Metal Fabrication

1. The owner shall retain an independent testing agency or the structural engineer of record to perform the observations and testing of this section.
2. As an alternate to fabricator certification, the contractor will pay for full-time inspection during the fabrication of the project steel. This inspection will be conducted by the owner's inspection company (at the fabrication plant). In addition, the fabrication plant must also be acceptable and approved in writing by the structural engineer, design professional, and building official. Do not proceed with work until the design professional has provided final written approval.

Section 5 – Structural Steel – Source and Field

Description	Method of Test	Standard (Pass/Fail)	Frequency	Action Required (If Failure Occurs)
1. Bolted Connections	Specification for Structural Joints Using ASTM A325 or A490 Bolts.	100% of friction connection bolts shall be torqued to provide the minimum required tension as per AISC and 100% connections inspected. For bearing type bolted connections 100% of bearing type bolts and 100% connections visually inspected. Two bolts of each type to be tested for chemical, hardness, and tensile proper-ties in accordance with the respective ASTM designation.	As pass/fail criteria.	Connection rejected, bolts retightened, and retested
2. Fillet Welds	AWS D1.1 Figure 5.4 and Table 6.1 (visual)	The weld shall have an acceptable weld profile, with no cracks or porosity. There must be adequate fusion and less than acceptable amounts of undercut.	100% of all fillet welds.	Connection rejected. Weld repaired and re-inspected.
3. Full and partial Penetration Welds	AWS D1.1 – Section 6 (Ultrasonic)	Only acceptable amounts of discontinuities shall be found on the ultrasound scope.	100% of all full and partial penetration welds.	Connection rejected. Weld repaired and re-inspected.
4. Decking Welds	AWS D1.3 – Section 4.5	Welds shall be visually reviewed for the locations, size, and length. Also their bond shape, reinforcement, and undercut shall be acceptable	100% of all deck welds.	Connection rejected. Weld repaired and re-inspected.
5. Stud Shear Connectors	AWS D1.1 Section 7	Welds shall be visually acceptable with a full 360??weld. Studs shall have acceptable sounding. Conduct bend tests according to AWS D1.1, Section 7 without any signs of failure.	100% of studs sounded with maul and 100% welds observed. Conduct bend tests according to AWS D1.1, Section 7.	Studs that fail should be replaced, re-inspected and resounded. Also, the replacement and additional studs for failed bend tests studs to be rebent to the angles required without any signs of failure.
6. Fabrication Plant and Project Erection	IBC (Chapter 17)	Test laboratory to review if special inspection required and perform the work if required.		

Section 07250 – Sprayed-on Fireproofing Construction

Description	Method of Test	Standard (Pass/Fail)	Frequency	Action Required (If Failure Occurs)
1. Thickness and Density of Sprayed Fire- Resistive Material.	ASTM E605 UBC No. 7-6 Perform both methods independently on different areas.	Required thickness and minimum individual and density values as listed in the appropriate U.L. design to meet design fire rating.	Test both methods independently.	Insufficient thickness areas should be resprayed and tested. Low densities may be corrected with changes in spraying procedures, respray replacing and retested. Remove and replace unacceptable areas.
2. Cohesion/ Adhesion of Sprayed Fire-Resistive Materials.	ASTM E736 UBC# 7-6 Perform both Tests independently.	Refer to specification	Not less than one test from a column, beam and deck for each 10,000 sq. ft. of floor area or fraction thereof or for each floor if floor smaller than 10,000 sq. ft-- for the minimum testing for each test method.	Remove and replace unacceptable areas.
3. Asbestos Testing.		Polarized light microscopy. Zero percent asbestos.	Five bag samples prior to start of work and 3 times during application. Test for asbestos content dry (before adding water to fireproofing).	Reject material.

Section 07510 – Roofing

1. All roofing and sheet metal work shall be inspected full time 100% during construction.
2. Inspectors will check night seals, drain edges, and penetrations for water tightness every night before leaving job site.
3. Inspectors will report for repair/relocation all unanticipated piping, conduit, and masonry conditions.
4. Inspector will, each day, consider weather conditions to determine if that day is a roof working day for purposes of liquidated damages.

Section 07900 – Sealants (for exterior applications)
Pre-Construction

Description	Method of Test	Standard (Pass/Fail)	Frequency	Action Required (If Failure)
1. Peel Strength Testing.	N/A	Each substrate type in which sealant is to be in contact with, must be reviewed or tested by the manufacturer during the preconstruction meeting. A peel test on at least one substrate must be performed by the manufacturer during the meeting. contractor to supply list of all substrates for exterior sealants.	As discussed in standard.	Written approval must be provided by manufacturer discussing each substrate and compatibility. Primer is required for specified exterior applications. Manufacturer to provide type and application.

Section 07900 – Sealants
Construction

Description	Method of Test	Standard (Pass/Fail)	Frequency	Action Required (If Failure)
1. Surface Preparation	N/A	Design professional to review sealant substrate on-site with manufacturer and owner's representatives to observe that surface preparation was acceptable. Placed concrete, mortar, and grout require 28 days of field curing before sealant or primer application.	Once for each substrate type.	Complete surface preparation.
2. Application Review	N/A	Check that primers have been used. Review applications for sealant joint wetting, tooling, shoulder bond, and general cross section configuration. Also review identifications and mixing time (typically 5 to 7 minutes).	Spot-check basis for each type of substrate.	Remove unsound sealant and adjust application.

Section 08410 – Aluminum Entrances and Windows

1) Specify that the window manufacturers shall submit and window installer shall install a sample window at pre-installation conference under the inspection of the owner's project manager and architect.

Section 15990 – Testing, Adjusting and Balancing

1. Specify that balancing shall be performed by an independent balancing contractor hired by the general contractor and shall be 100% inspected by the owner's balancing consultant.
2 Specify that the balancing company measure the minimum fresh air at both peak summer and peak winter modes.
3. Require a length of straight duct inside the building to permit accurate measurement of outside airflow.

Section 16000 – Electrical Service Testing

1. Medium voltage electric service testing:
    a. At new installations contractor to perform a "Megger" test on medium voltage service cabling. Test to manufacturer guidelines.
    b. At existing installation no requirement for "Megger" testing shall be required unless owner has reported a history of problems with regard to repairs or faults. In that case, a further in-depth investigation shall be done by a testing agency.

Division 14 – Conveying Systems
Section 14200

Minimum Requirements

Elevator equipment room shall be in compliance with the appropriate codes including the State of Idaho Elevator Code. Specific items include but are not limited to:

1. Furnish and install 60 minute rated door and frame in the opening to the equipment room.
2. Floor, walls, and ceiling shall be 1-hour rated.
3. No extraneous conduits, ducts, or other non-elevator systems shall pass within the envelope.
4. Maintain required clear work areas around all electrical panels.
5. Install fire sprinkler systems.
6. Exhaust vents shall have a fire damper at the fire rated envelope.
7. Joints between masonry/concrete and gypsum wallboard shall be fire caulked. The fire caulking shall not be applied over drywall tape, paint or any other non-rated material.

The elevator shaft shall be in compliance with the appropriate codes including the State of Idaho Elevator Code. Specific items include but are not limited to:

1. All penetrations in the shaft shall be sealed with fire caulk, no exceptions.
2. Furnish and install a smoke curtain at each opening.
3. The ladder into the shaft shall be constructed in accordance with the IBC and OSHA requirements.
4. The floor, walls, and ceilings shall be rated per applicable codes.
5. The elevator shall comply with the IBC requirements for accessibility.

This list indicates the correction notices the university has received for the elevators built in the last two years. Attention to the matters at the design phase will eliminate delays in receiving an operating certificate for the elevators at completion.

Appendix 15 – Mechanical

Section 15410

Provide hose bibs @ each entrance.

Section 15105

Insulation for Steam Distribution:
Provide metal jackets over fiberglass insulation on all steam piping inside the building.

Appendix 16000 – Electrical Standards

1) Outside Lights
2) Street lights- mold cast round / 20 ft round aluminum pole 150 w MH
3) Style of fixture heads- shoe box or modified shoe box
4) Outside fixture poles- square steel 40”, 16”, 14” as per specs
   a) 40 ft fixtures- 1000- 250 watt (M.H.)- Parking lots
   b) 14 ft fixtures- 175-100 (M H) watt- sidewalk lights

5) Voltage- 277 Multi Tap (M.H.)
6) Color- Brushed aluminum
7) Recommended manufactures- DMA lighting
8) Photo cells- Connected to power link input points
9) Outside lights circuits controlled on power link panels
10) Side walk heat mat (Raycem brand)- if electric, connect to power link

11) Clocks
12) Simplex 120 volt flush mount – 12' square
13) Wiring- 2 circuit series looped in 12" flush can
14) 60 Hz.Signal generator, recommended manufactures- Simplex, American Time & Signal
15) ¾" EMT between all clocks
16) Network drop at the head of clock circuit signal generator
17) Building lights- HID on wall or recessed lighting, no ground lights
18) Washers and dryers- Maytag
19) Laundry facilities- Maytag/ Milner- ADC- commercial
20) Exit signs- LED low power consumptions, no battery back up lights, unless specified
    i) Handicap Door Operators- BEA magic switch (Bradshaw doors-SLC)

21) Motors
22) 10 HP 3 phase motors or larger shall be heavy-duty asynchronous speed type for 3 phase, 60 Hz. Motor insulation shall be premium inverter grade, rated for 1600 volts minimum, meeting or exceeding NEMA MG1, Part 31.40.4.2. Motor shall be ISO-9001 certified.
23) Square D motor control centers- MCC
24) Overhead door motors ¾ horse or larger
25) Handicap door Operators- BEA magic switch (Bradshaw Doors- Salt Lake City Utah supplier).
26) Sealed bearings in motors
    a) Baldor brand motor
    b) Soft Start or VFD on 10 HP or larger motors, Preferred manufactures- Square D, Cutler Hammer, GE
27) Inside lights
28) T8 electronic ballast – cable supported indirect
29) Troffer- Lithonia T8 2-3 tube electronic ballast- strip lights Lithonia 2-3 tube wrap around fixture- DMA lighting

30) Vaults- 8'x8'x8' precast or concrete poured
    a) Vault Lid- Single hinged aluminum 3'x 3' Bilco manufactured door with gutter and drain to curb using 1½" pipe (Cannon Sales- Salt Lake City Supplier 800-368-0542)
31) Duct Banks
    a) Stacked 4" for data/ 5" for electrical- 40 schedule PVC with metal rigid elbows
    b) Concrete- formed red concrete to encase entire bank
    c) Depth- 4 feet to the bottom of the bank with 2 feet fill on top

32) Elevators
    a) DMC1 Thyssen (Preferred supplier)

i) Full diagnostic capabilities
ii) Training from factory
iii) Full one year warranty
iv) Fast tool or Computer diagnostics
v) State and University inspections apply
vi) Hole-less hydraulic
vii) Electronic door edges

33) Panel Boards
a) Main gear with breakers- Square D
b) Main panel- Square D I-Line
c) Panels- Square D NQOD 42 space
d) All panels on lighting will be power link G-3 (Square D)
e) A panels on computer will be power link with built in TVSS NQOD
f) Power logic meter on main switchgear Square-D CM-4000 with ECC 21 Communications and network drop and daisy chain with Belden 8723 wire between G-3 panels.

34) UPS
a) Liebert or MGE with SNAP Board and software to monitor and trouble shoot
b) Training on all new models
c) 1 year warranty
d) Network drop at each UPS

35) High Voltage
a) Transformers- Square D, GE, Cooper
i) Pad mount outdoor
ii) 3 phase oil filled- drain valve and test valve
iii) Pressure gauge and relief valve
iv) Fusible loop fed with lighting arrestors
v) Load tap changers
b) 200 Amp elbows with Capacitive Test points
c) 600 amp will have 200 amp well inserts on the back for phasing with protective caps
d) 3M tape shields/ 3M splice kits- elbows recommended manufactures- 3M, Cooper, Elastimold
e) All high voltage terminations by owner-credit to owners for supplies and labor
f) Building wire #2 tape shield 133%, cable manufactures Okonite or Hubble Kerite
i) Loop wire 500 MCM as above by contractor
g) All wire installed as per manufacture and NEC
h) G&W gas switches with safe SF-6 gas and outdoor enclosures- 600 amp feed through- 200 amp VFI protected (generally owner supplied)
i) Mounted and bolted on a concrete pad with 4'x3'x3' fiber or concrete basement under switch with 16' tails on wire

Appendix 17000 – Telecommunications and Information Technology Guidelines

FUTURE